

Claims

1. A miniature electric motor comprising
a tubular housing; and
5 at least one end cap, said end cap having a boss portion fitted inside the housing, a flange which abuts an axial end of the housing, and an engagement portion;
said housing having at least one circumferentially extending finger which is radially deformed into contact with the engagement portion of the end cap to capture the end cap to the housing;
10 wherein the engagement portion includes an axially projecting ridge and the finger bears axially onto the ridge to nip the end cap to the housing.
2. The motor of claim 1, wherein the ridge is substantially circumferentially extending along the engagement portion.
- 15 3. The motor of claim 1, wherein the engagement portion has a substantially planar portion lying in a radial plane of the motor from which the ridge projects axially away from the housing.
- 20 4. The motor of claim 1, wherein the end cap is a molded resin body and the engagement portion is a recess formed in the flange and boss portion into which the finger is deformed.
- 25 5. The motor of claim 4, wherein the ridge is formed along the outer peripheral edge of the recess.
6. The motor of claim 1, wherein the ridge has an outer chamfer for guiding the finger.
- 30 7. The motor of claim 1, wherein the engagement between the ridge and the finger involves at least part shearing of the ridge to accept the finger.
8. The motor of claim 1, wherein the finger has an axially inner edge which engages the ridge, said inner edge is tapered with respect to a radial plane of the motor.
- 35 9. The motor of claim 1, wherein the housing has an even number of fingers formed as opposing pairs by T-shaped holes in an end portion of the housing.

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10. The motor of claim 9, wherein the end cap has a number of engagement portion corresponding in number to the pairs of fingers and the or each engagement portion accommodates one pair of fingers.

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11. A method of connecting an end cap to a tubular housing of a miniature electric motor, the method comprising the steps of

providing an end cap with a flange portion, a boss portion and at least one engagement portion,

10 providing a tubular housing with at least one circumferentially extending finger,

inserting the boss portion of the end cap into the housing such that the flange abuts an axial end of the housing and the recess is aligned with the finger,

15 and by providing an axially projecting ridge on the engagement portion and deforming the finger radially so that an axially inner edge of the finger axially engages the ridge to prevent axial movement of the end cap with respect to the housing.

12. The method of claim 11, wherein the step of deforming the finger includes shearing a part of the ridge thereby firmly holding the end cap to the housing.

13. The method of claim 11, including the step of providing a tapered surface to the axially inner edge of the finger thus causing a greater axial holding force the more the finger is deformed radially.

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14. The method of claim 11, including the steps of

providing two pairs of said fingers and radially deforming each pair of fingers into a respective engagement portion of the end cap, each finger having an axially inner edge which extends at an incline to a plane orthogonal to an axis of the housing, the axially inner edge being brought into contact with an axially inner surface of the recess by radially deforming and continuing to radially deform the finger causing the inner edge of the finger to exert an axial force on the surface of the end cap to clamp the end cap to the housing.

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